

Air Force Civil Engineer Center



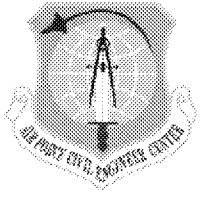
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Site ST012

**Former Liquid Fuel
Storage Area**

**BCT Meeting
17 April 2018**

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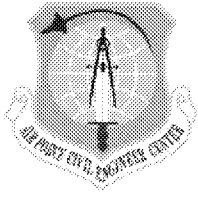


Site ST012 Outline

- **Summary of activities since March BCT update**
- **Update on JP-4 degradation based on methane at SVE system**
- **LNAPL monitoring/removal update**
- **Path forward**
- **Re-baseline review**
- **Injection review**
- **Extraction/Treatment review**
- **Monitoring review**

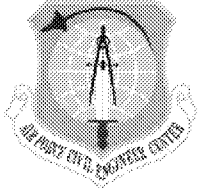
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Site ST012 Activities Since March

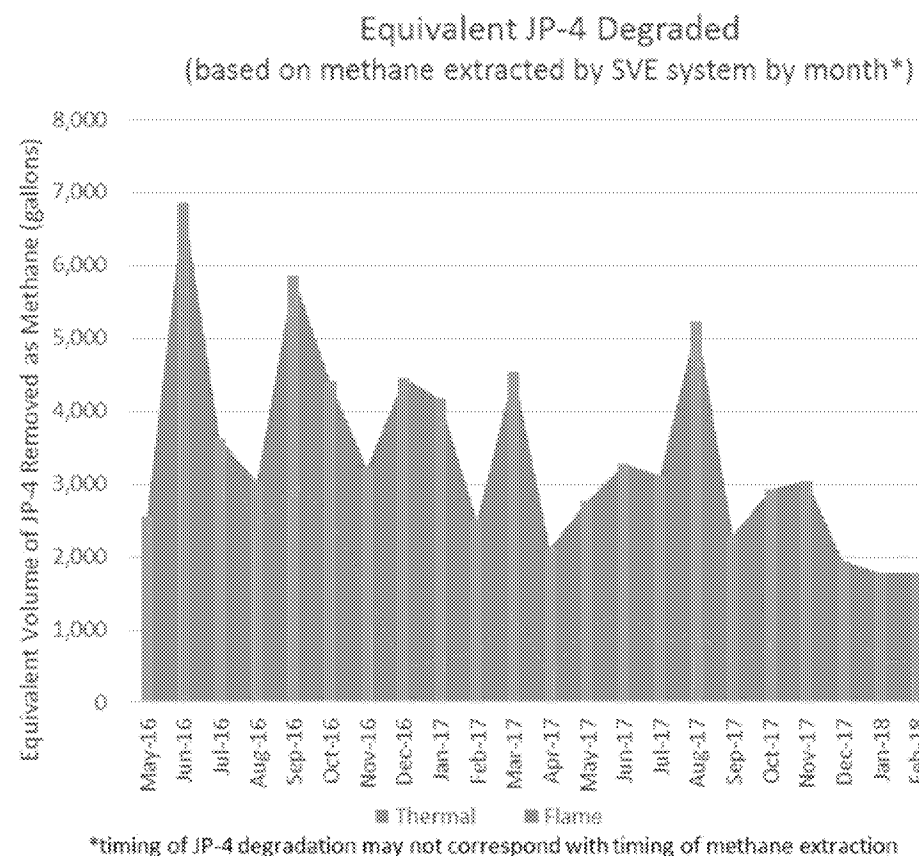
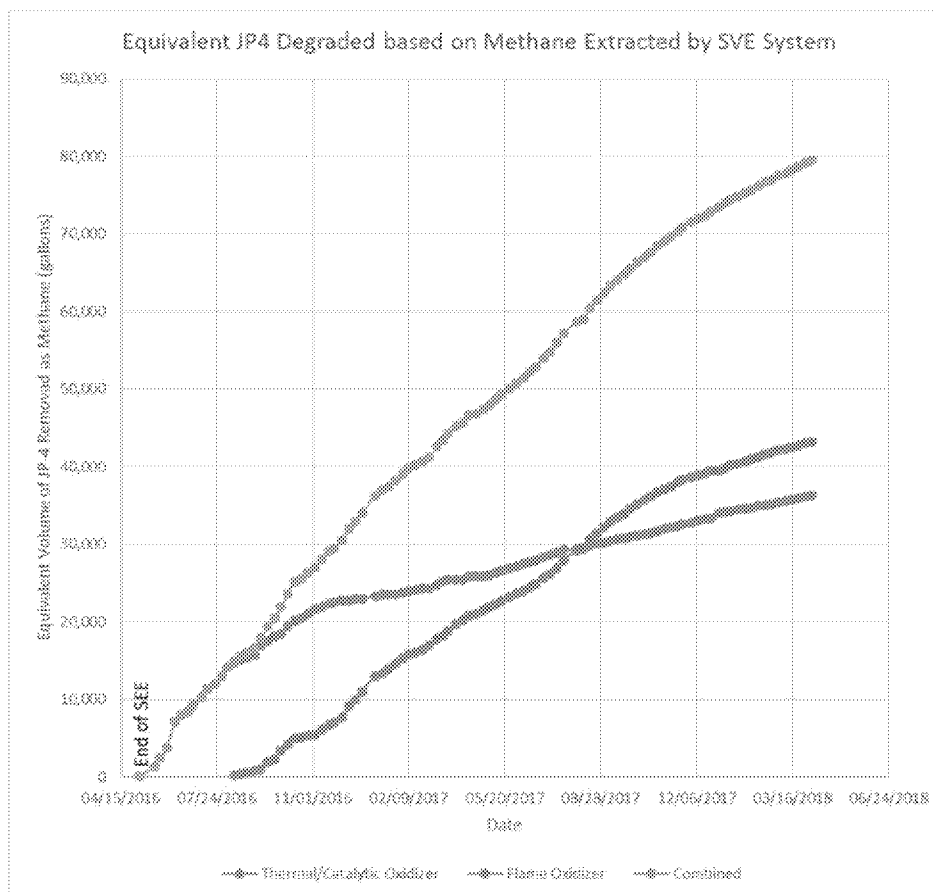
- **Continued SVE operation**
- **Continued LNAPL screening in accessible SEE wells and Phase I characterization wells**
- **EBR Pilot Study Implementation Work Plan submitted 5 Apr 2018**
- **Started EBR pilot study re-baseline sampling**
- **Commenced activities to complete EBR pilot study construction**



JP-4 Degradation Based on Methane Removed with SVE (through 5 Apr)



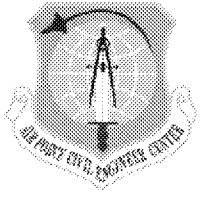
Site ST012 SVE System Equivalent JP-4 Degradation Based on Methane Removed



Estimates through 5 Apr 2018.

Estimated JP-4 degradation as methane is in addition to JP-4 removal reported for SVE

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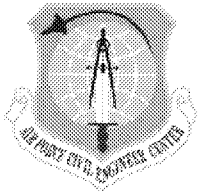


LNAPL Monitoring Update (through 4 Apr)

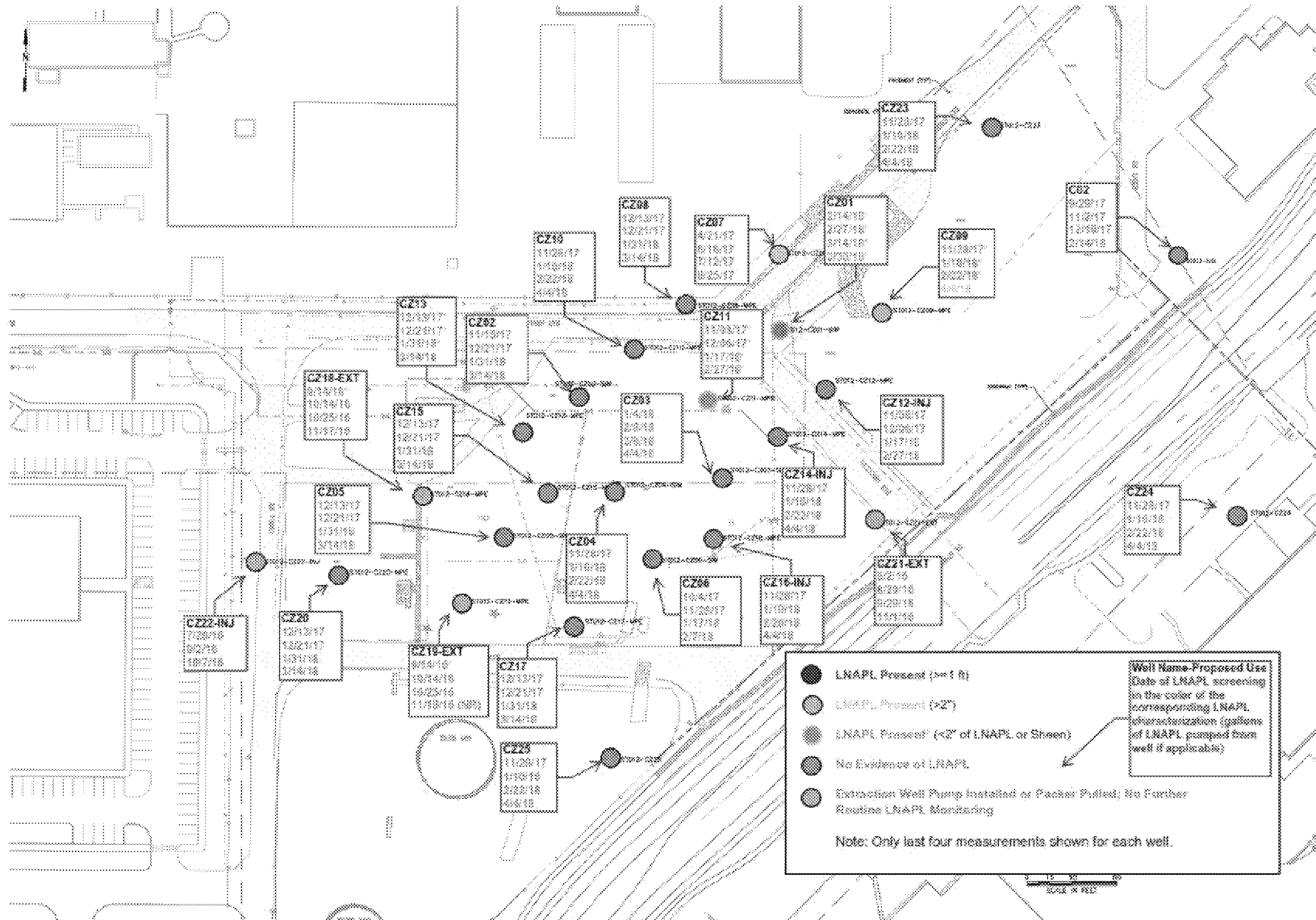
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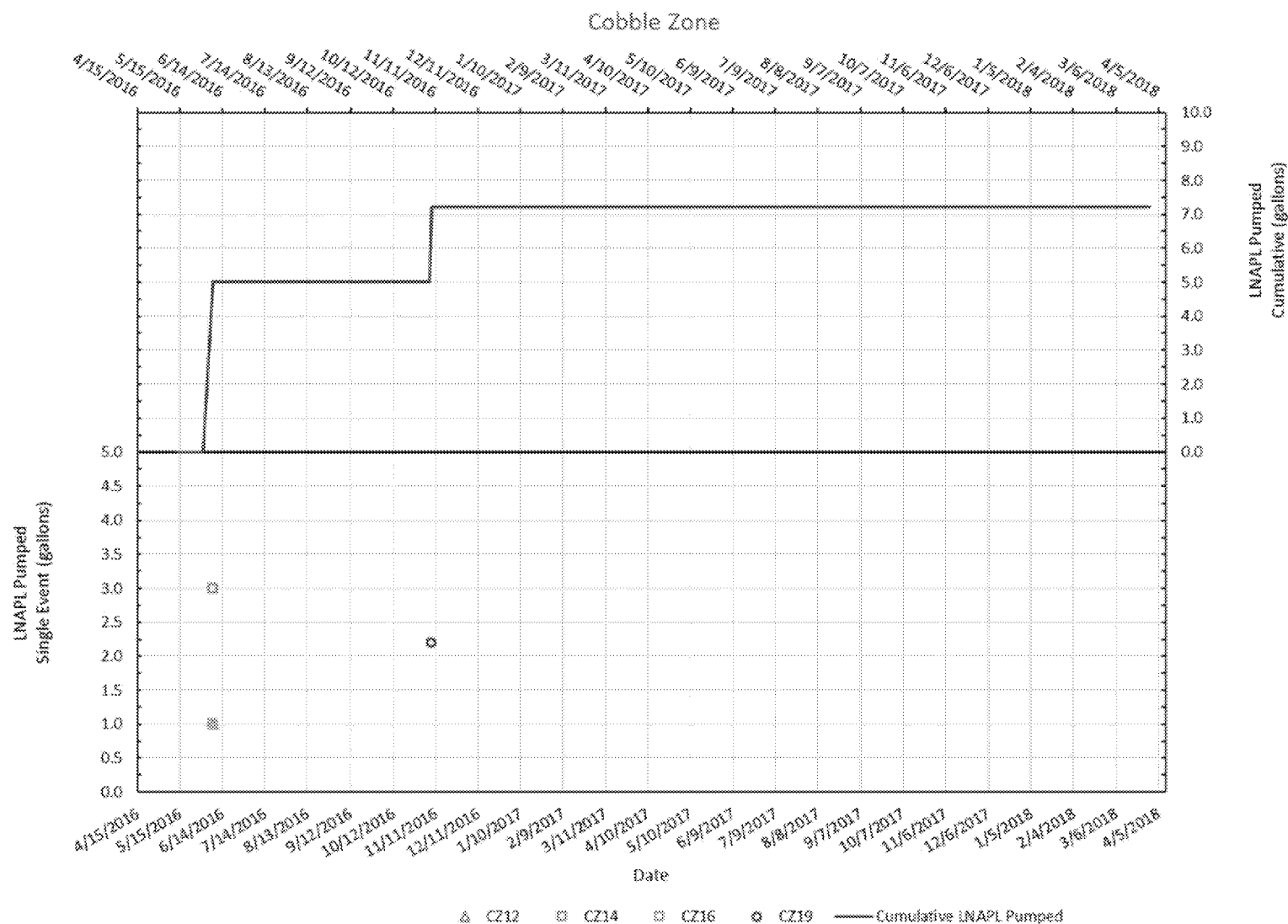
LNAPL Monitoring/Removal Status Cobble Zone



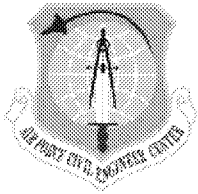
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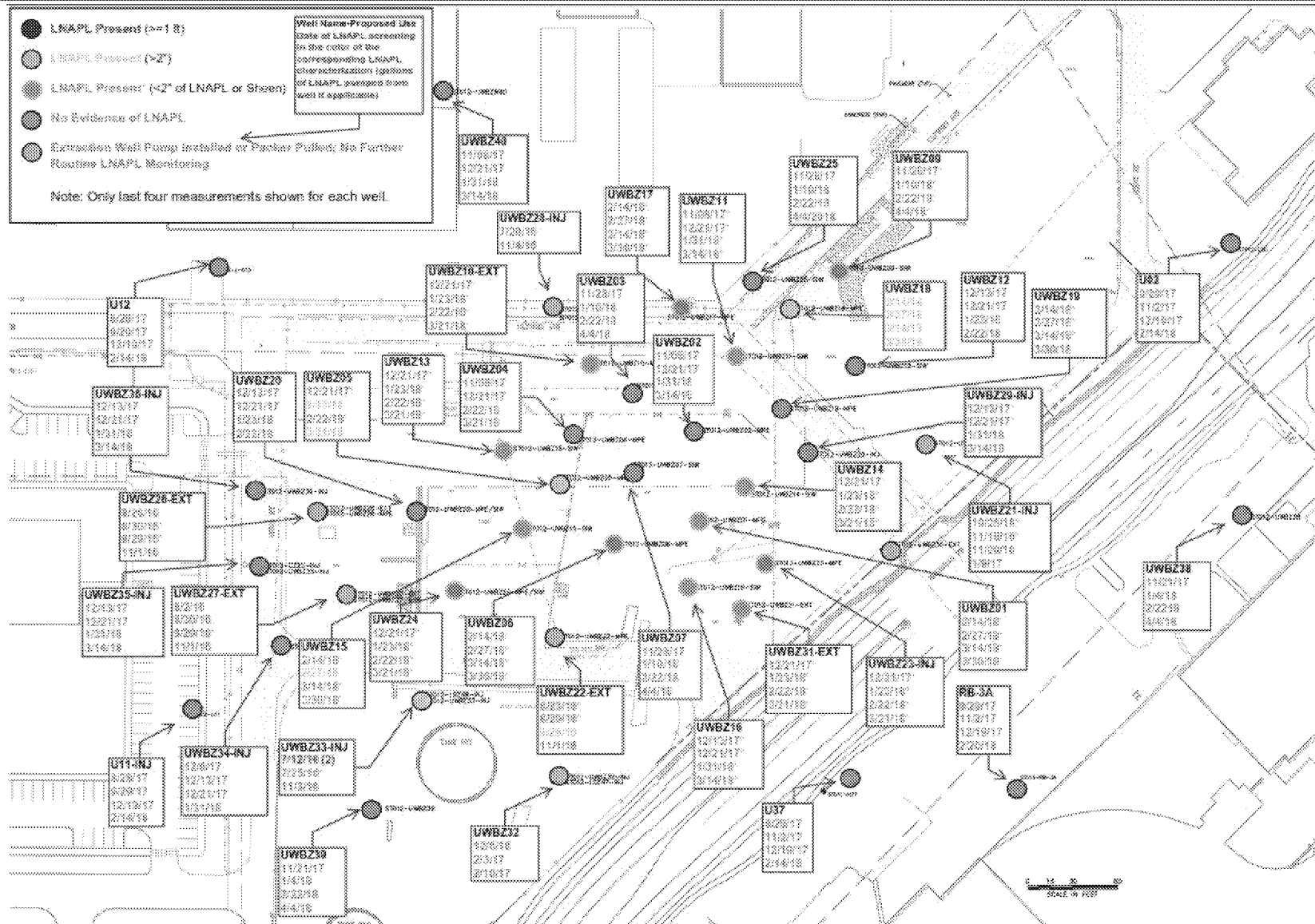
LNAPL Monitoring/Removal Status Cobble Zone



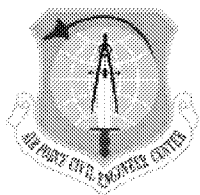
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LNAPL Monitoring/Removal Status Upper Water Bearing Zone

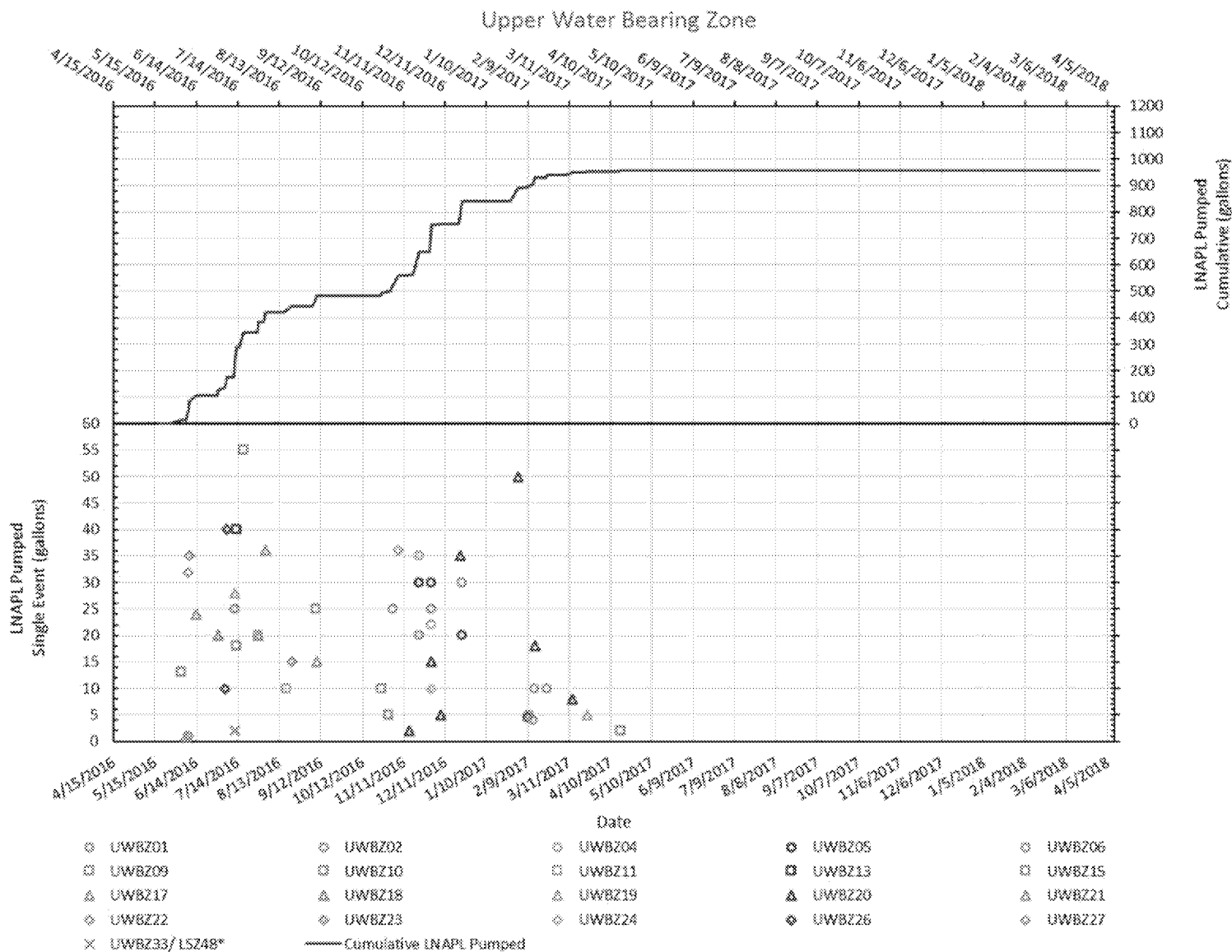


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LNAPL Monitoring/Removal Status

Upper Water Bearing Zone

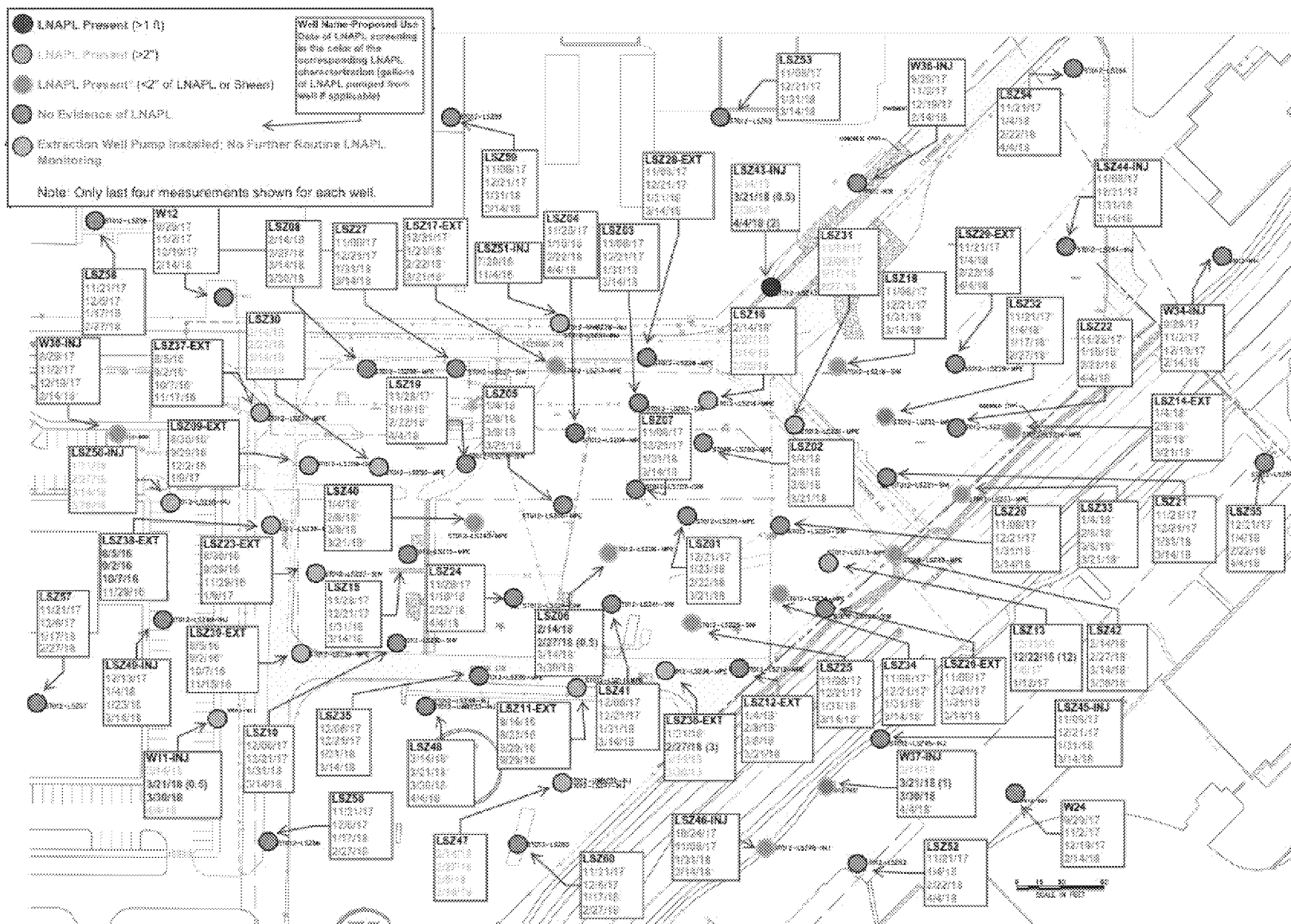


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LNAPL Monitoring/Removal Status Lower Saturated Zone



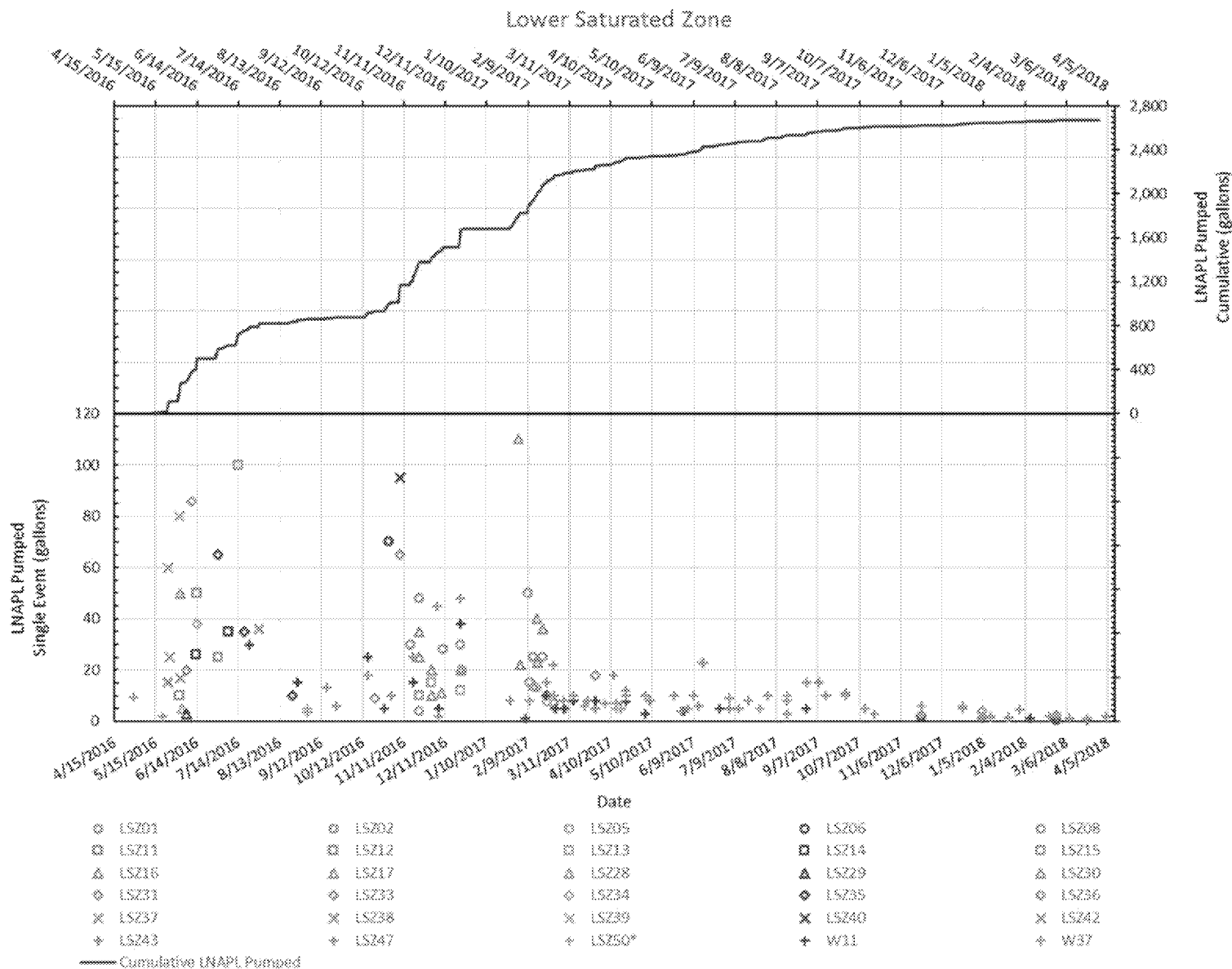
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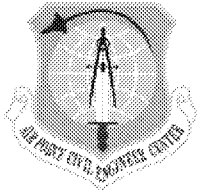


LNAPL Monitoring/Removal Status

Lower Saturated Zone

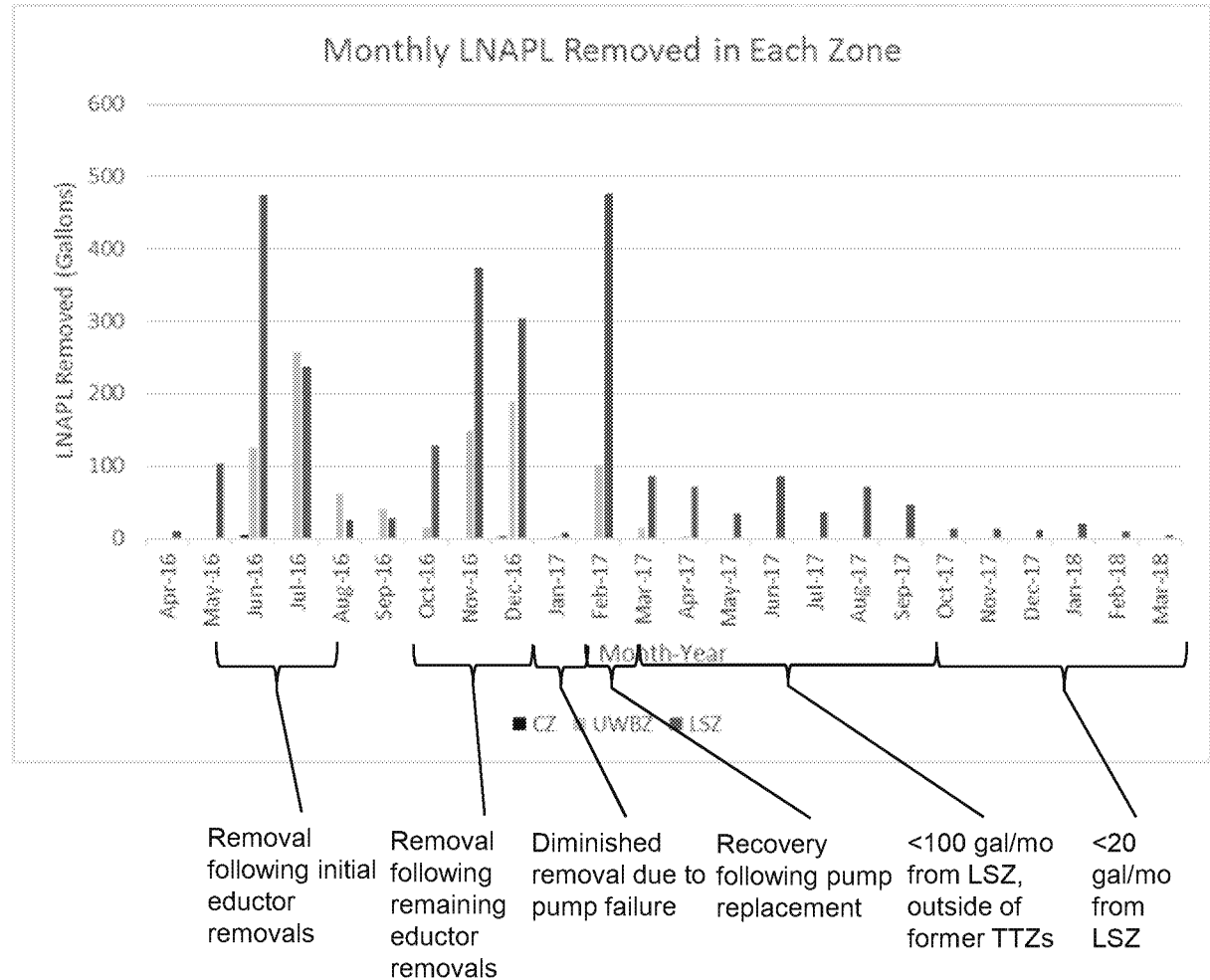


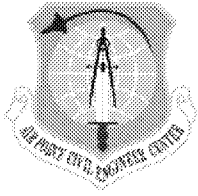
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ST012 LNAPL Monitoring/Removal Summary

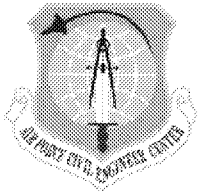
- **CZ** – 7 gallons of LNAPL removed. None since Nov 2016
- **UWBZ** - 956 gallons of LNAPL removed. None since Apr 2017.
- **LSZ** - 2,671 gallons of LNAPL removed. 4 gallons removed since Mar 2017 update (W11, W37, LSZ43).





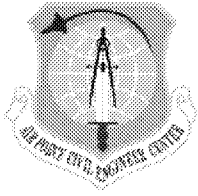
Site ST012 Activities Apr-May

- Continued SVE operation
- Continued LNAPL screening
- Pilot Study Implementation Work Plan 5 Apr
- Re-baseline Sampling 2-27 Apr
- EBR Construction 2 Apr – mid May
 - Injection piping
 - Pump relocation/installation
 - Sulfate storage area/order sodium sulfate
 - Sulfate mixing tanks
- EBR
 - Startup extraction/shakedown treatment system mid May
 - Evaluate effect on LNAPL accumulation/recovery mid May
 - Injections TBD (early June depending on LNAPL response)



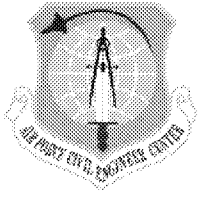
Site ST012 Re-Baseline Sampling

- **Initial baseline sampling was performed in May/June 2016 and results are summarized in the Third Quarter 2016 Report (some data also included Pilot Study Implementation Work Plan)**
- **Re-baseline sampling ongoing**
 - **VOCs, TPH, metals, nitrate, and sulfate for select injection, extraction, and monitoring wells**
 - **PIANO for LNAPL (where available, may have to wait in some locations for extraction startup)**
 - **SRB and EBAC populations by qPCR**
 - **Data to be used as baseline for evaluating operational adjustments**



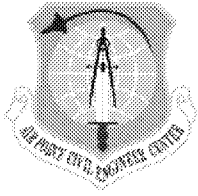
Site ST012 Initial Groundwater Extraction

- **Extraction will begin before injections to establish flow and monitor for LNAPL**
 - Extraction wells will be turned on sequentially, starting with cooler upgradient wells (e.g., CZ19, CZ20, UWBZ26, UWBZ27, LSZ09, LSZ23, LSZ37, LSZ38, and LSZ39)
 - Then adding warmer wells and those with higher potential for LNAPL (CZ07, UWBZ28/LSZ51, UWBZ21, UWBZ30, UWBZ22, LSZ11, LSZ28, LSZ29, and LSZ12)
- **Extraction will continue during injection for TEA distribution**



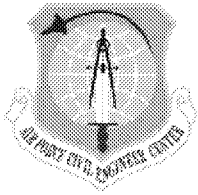
Site ST012 Injection Process

- **Phase 1 injection quantities will take place in four steps over approximately 1 year. Based on monitoring data, injection quantities may be adjusted in later steps**
- **TEA initially mixed with water in roll-off bin at concentrations near solubility**
- **TEA transferred to frac tank and diluted to injection concentration**



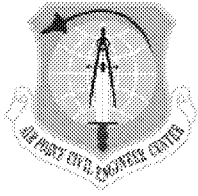
Site ST012 Injection Process

- **Simultaneous injections of TEA into 5 piped wells plus 1 remote well using water trailer**
 - Frac tanks are piped to wells with a shut-off valve and flow totalizer on each injection well.
 - Groups of piped wells scheduled for simultaneous injection designated by group number (G1) on subsequent slides in order of group sequence. As planned injection volume is reached the well valve is closed while injection continues to wells within the group.
 - Water trucks injection wells also listed in order of injection sequence (W1).
 - Sequence generally starts with lower permeability (UWBZ) and upgradient locations and proceeds to higher permeability (e.g. CZ) and downgradient locations.

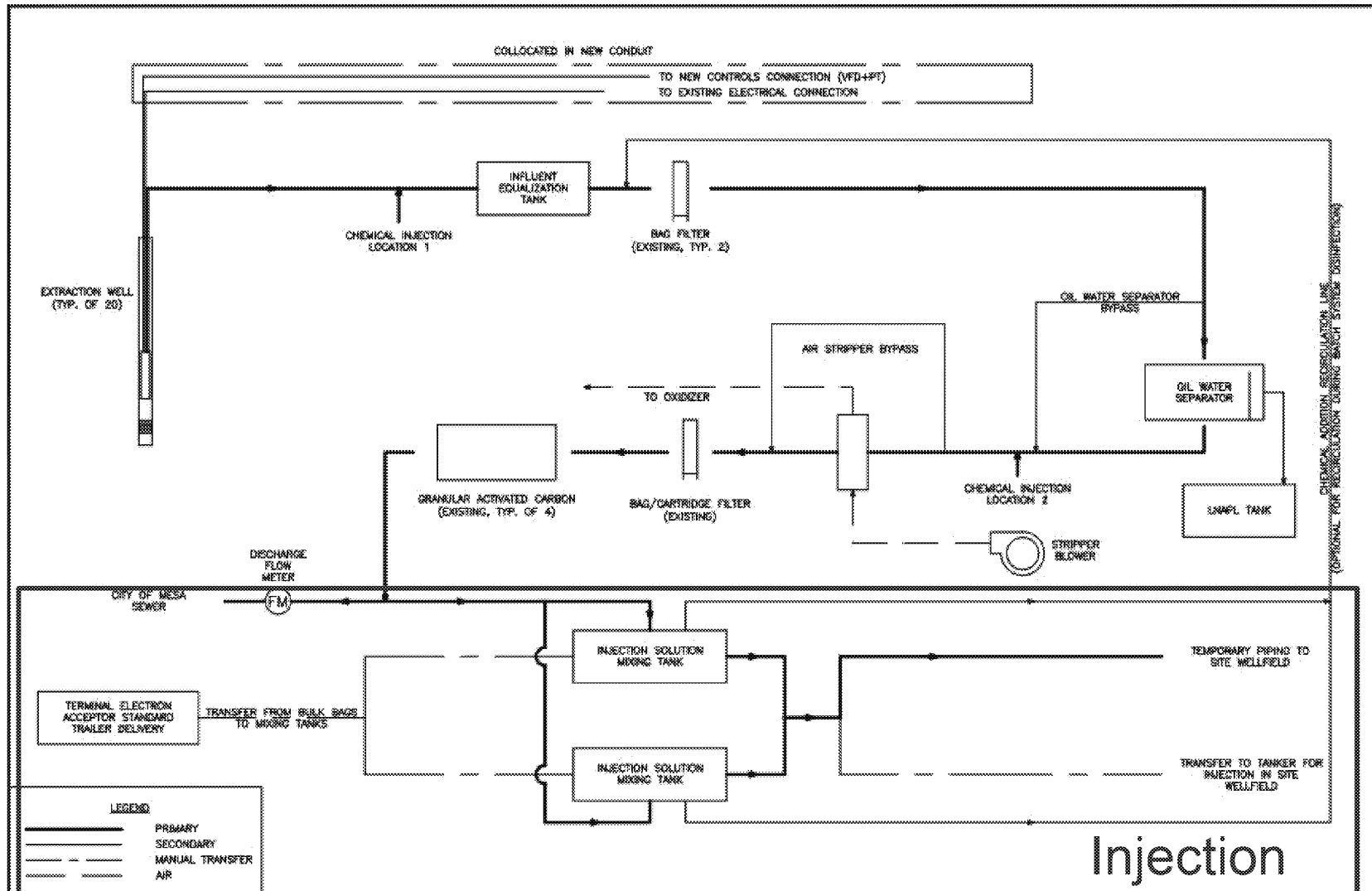


Site ST012 Groundwater Extraction/Treatment Process

- **Extraction is ongoing during injections**
- **In some wells (predicted short travel time locations) extraction will cease between injection steps. Other wells (predicted long travel time) extraction may continue between injection steps**
- **Extraction will cease after injection steps are complete and sulfate breakthrough observed at extraction well**
- **Treatment consists of equalization, oil-water separation, particulate filters, air stripping, and activated carbon**

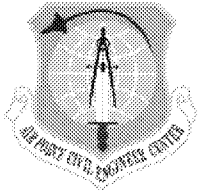


Site ST012 Injection System Schematic

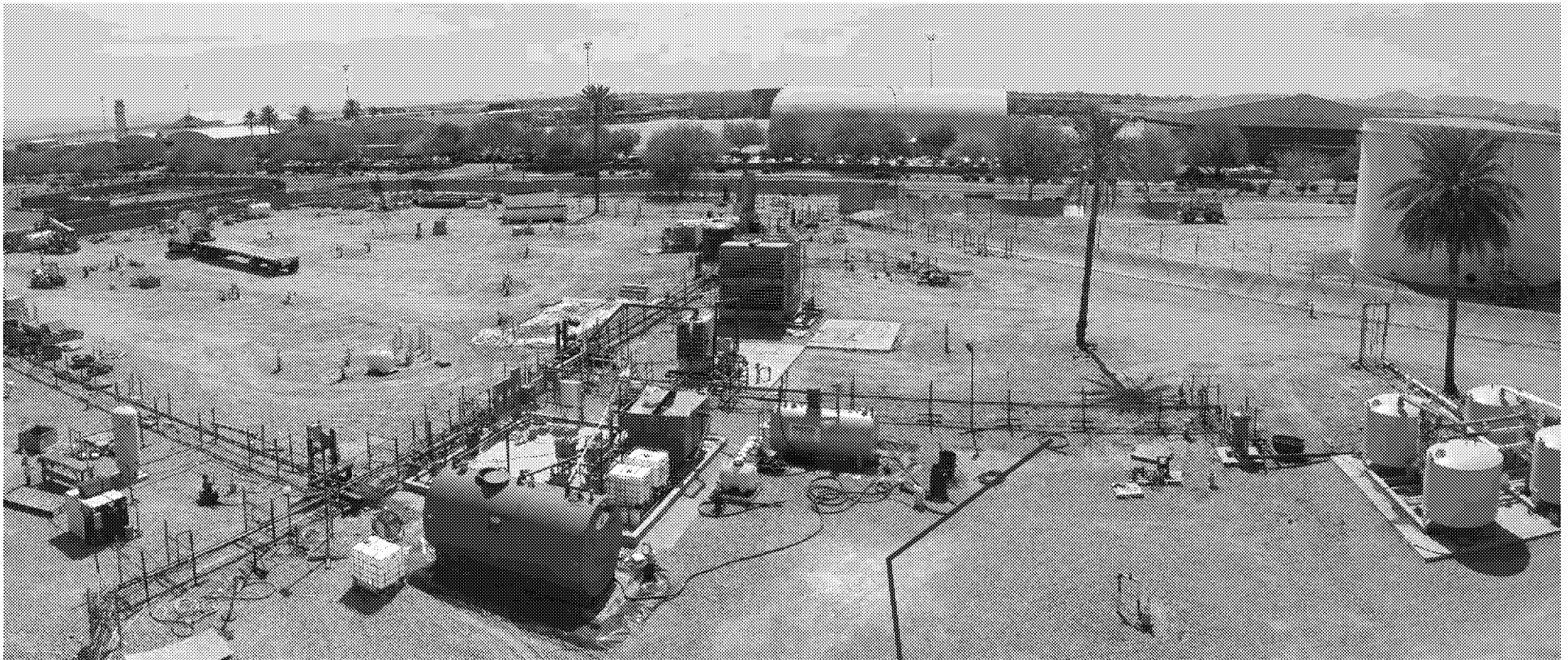


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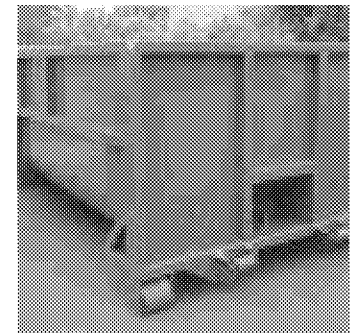


Site ST012 Injection System Layout

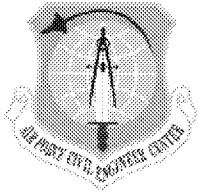


Bag Dump/Pre-Mix

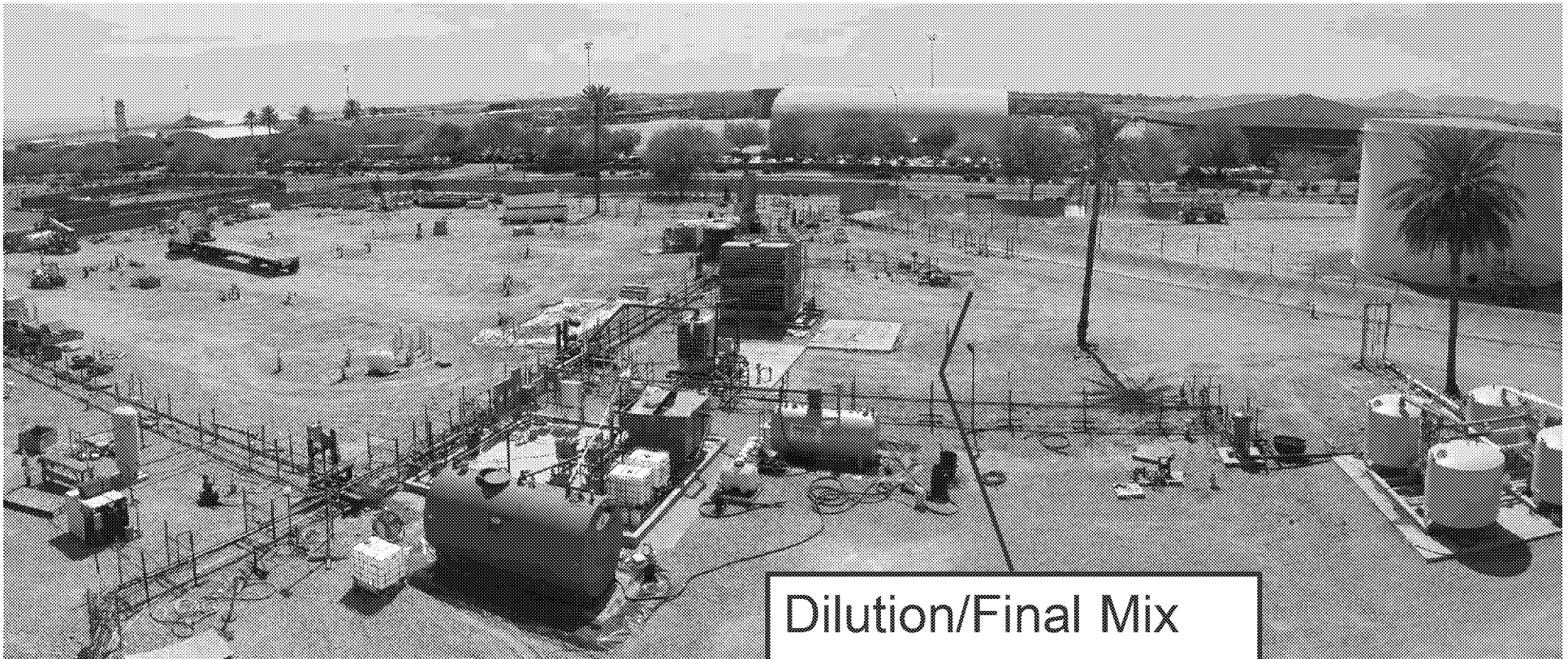
- 50 CY roll off with fixed end wall



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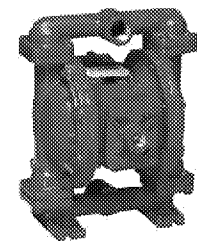


Site ST012 Injection System Layout

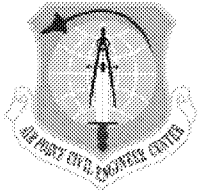


Dilution/Final Mix

- (2) 21,000 gal frac tanks
- Transfer by air-operated double-diaphragm pumps
- Pipelines to most wells, water trailer for remote wells



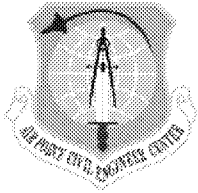
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Site ST012

CZ Locations and Sequences

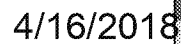


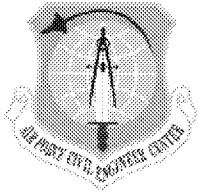


Site ST012

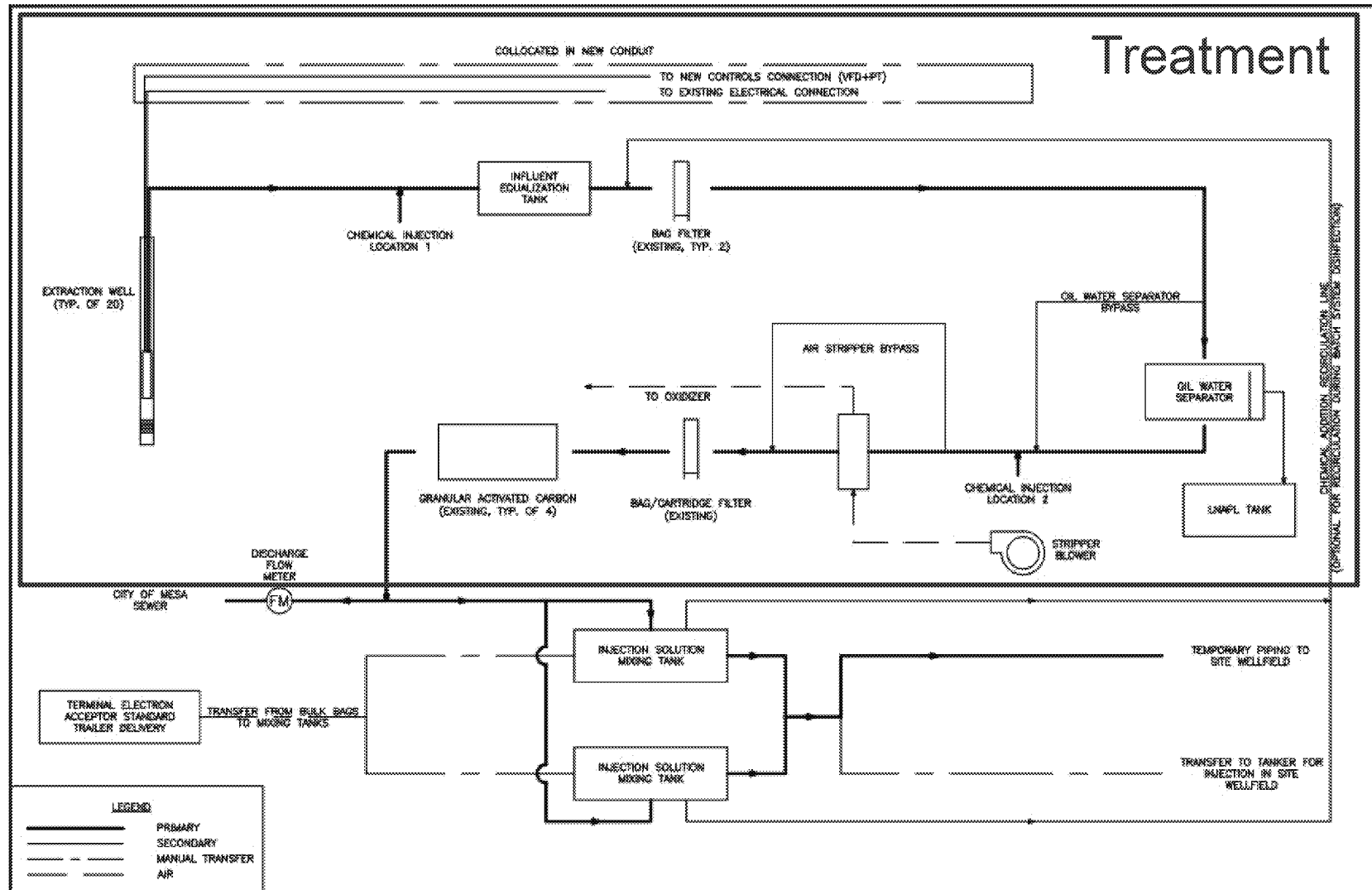
UWBZ Locations and Sequences

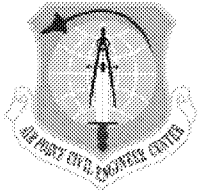




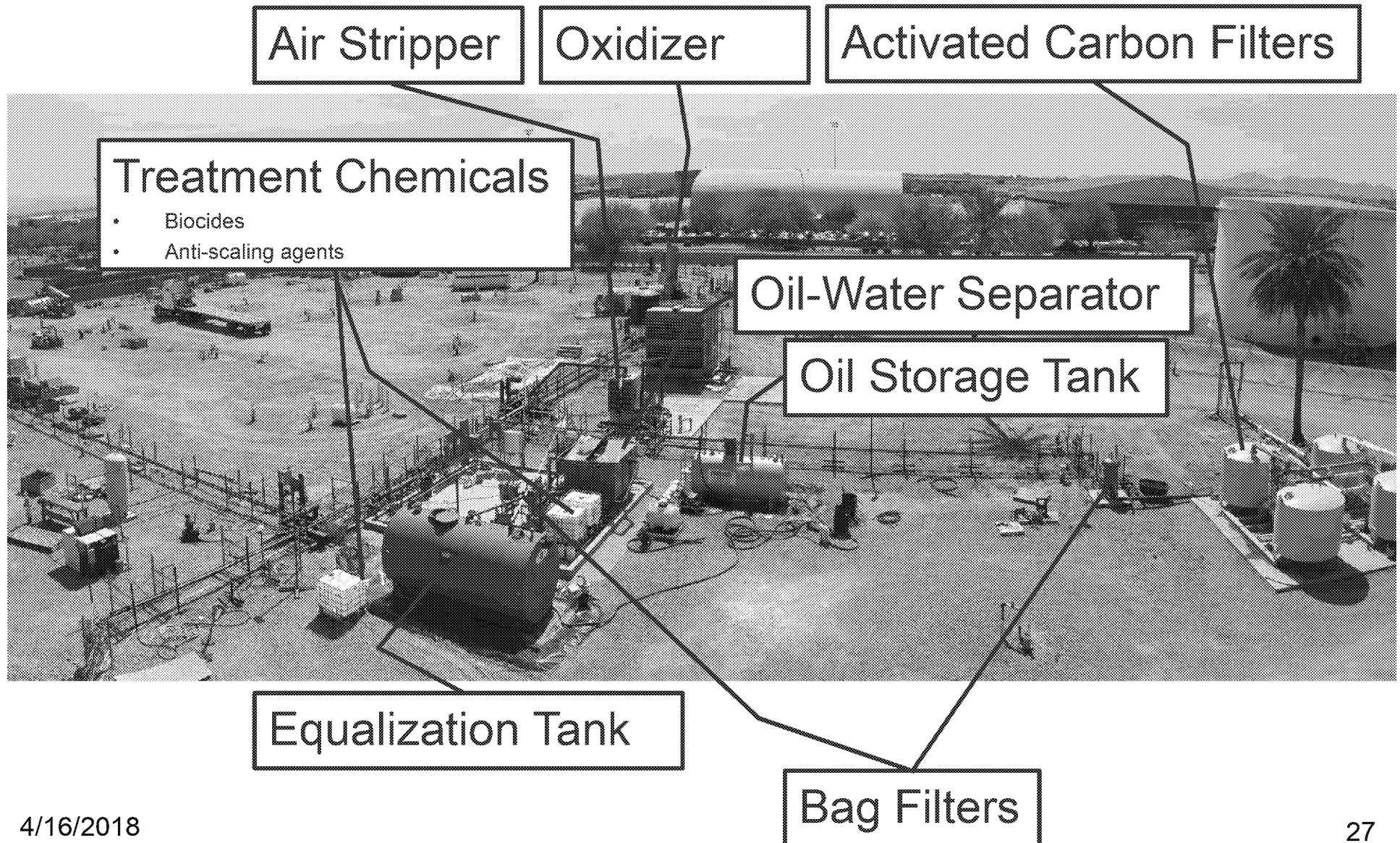


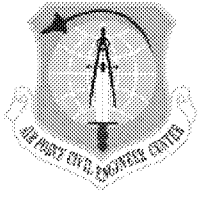
Site ST012 Treatment System Schematic





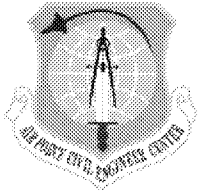
Site ST012 Treatment System Layout





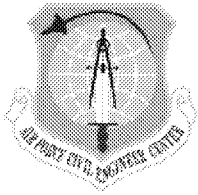
Site ST012 Operational Sampling

- **Sodium sulfate**
 - Sulfate and metals for product QC – 1 per delivery lot
- **TEA injection fluid**
 - Field screen daily, metals and sulfate weekly to confirm injection concentrations
- **Injection wells**
 - VOCs, metals, sulfate, nitrate for performance evaluations – quarterly



Site ST012 Operational Sampling

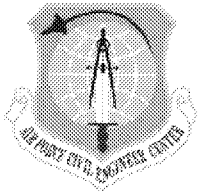
- **Extraction Wells**
 - VOCs for remediation progress – quarterly
 - Metals and TPH for remediation progress and effects – semiannually
 - Sulfate for TEA distribution and consumption – biweekly for first month, then monthly – select wells with shorter predicted travel times will be weekly for the first two months, then monthly – field test with 10% lab confirmation



Site ST012 Operational Sampling

- **Monitoring Wells**

- VOCs, TPH, metals, sulfate for Remediation Progress - quarterly
- PIANO analysis of LNAPL for composition changes – annually
- SRB and EBAC populations by qPCR for changes in microbial populations – between 6-12 months after initial injections
- SIP for confirmation of biodegradation – between 6-12 months after initial injections
 - Bio-Traps seeded with ^{13}C labeled benzene and naphthalene
 - Evaluate ^{13}C accumulation in PLFA and DIC
 - Extra Bio-Traps in select wells to evaluate time in well



Site ST012 Operational Sampling

- **Process Water**

- Treatment Influent - VOCs, TPH for mass removal – monthly
- Activated carbon influent and mid-fluent – VOCs for breakthrough – weekly, transitioning to monthly when stabilized
- Activated carbon effluent/treatment discharge
 - VOCs for breakthrough and permit – monthly
 - TPH, oil and grease, SVOCs, pesticides, PCBs for permit – quarterly
- Discharge flow
- Semi-annual submittal of discharge reports

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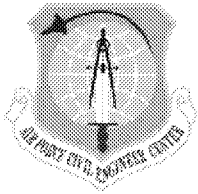


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**Site LF004 Landfill
Remedial Action**

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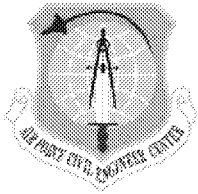
Site LF004

Former AST SVE System Update

Summary through 6 Apr 2018

- **SVE treatment of vadose zone complete. SVE system shutdown in Oct 2017. Total mass removed via AST SVE is approximately 97.1 pounds.**
- **TCE and PCE concentrations have been below Shallow SVSLs in the AST area for past eight quarters and below Deep SVSLs for past four quarters with the exception of VMP-11D**
- **Quarterly vapor sampling will continue at VMP-11. Next sampling event in May 2018.**



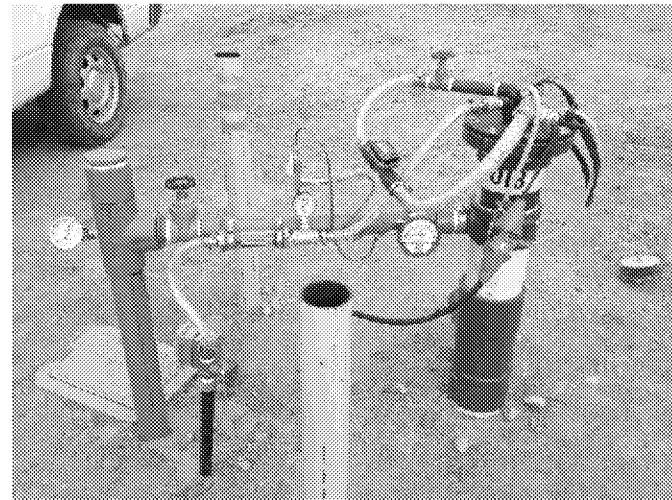
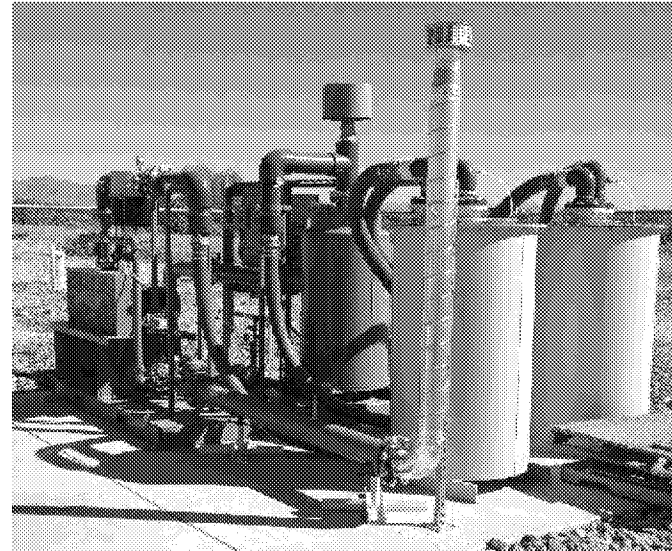


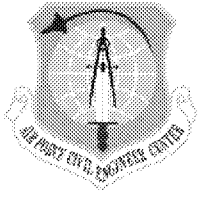
Site LF004

LF01-W17 Area IWAS System Update

Operations Summary through 6 Apr 2018

- Began operation 29 Aug 2014 (approximately 41 months of operation). IWAS wells for oxidant injection and recirculation was completed in Feb 2018
- An estimated 13.6 pounds of TCE and PCE was removed by vapor extraction from IWAS system during remedial operations
- Final Nov/Dec 2017 PDB results indicate only W17M was above the TCE MCL at 8.0 $\mu\text{g/l}$. Sufficient oxidant (292 mg/l) remaining to degrade residual TCE concentrations. Next PDB sampling in May 2018.





LF004 Remediation System Recent and Upcoming Activities

- **Quarterly sampling at VMP-11 will be performed in May 2018.**
- **Semi-annual groundwater sampling with PDBs will be performed in May 2018.**
- **Draft landfill cap inspection report issued to regulators on 12 Mar 2018**
- **Posting of analytical data to Sharepoint will continue as results are available**

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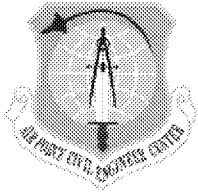


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**Site FT002
Fire Training Area Remedial
Action**

**BCT Meeting
17 April 2018**

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Site FT002 Update

- **Final FT002 Remedial Action Completion Report with response to regulatory comments submitted on 9 May 2017**
- **Received EPA comments on Final FT002 Remedial Action Completion Report on 5 Jun 2017**
- **ADEQ comments on FT002 Remedial Action Completion Report received on 11 Sep 2017**
- **Response to EPA and ADEQ comments under AF review**
- **If necessary, a technical conference call with regulatory agencies to resolve comments can be scheduled**

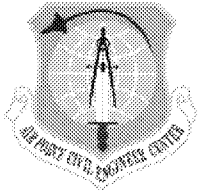
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**Site ST035
Former Building 760**

**BCT Conference Call
17 April 2018**



ST035 Update

- Final closure report with responses to comments submitted on 21 Jun 2017. AF submitted response to ADEQ query regarding sampling frequency on 26 Sep 2017.
- ADEQ review and approval of Site Closure Report in progress
ADEQ provided e-mail 6 Apr 2018 describing internal and public notice process for granting site closure.
- Site closure is anticipated to be June 2018

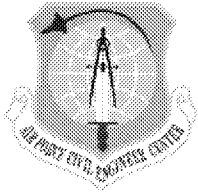
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Site SS017
Old Pesticide/Paint Shop**

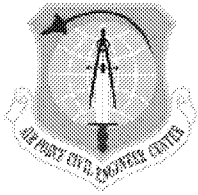
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SS017 Update

- **Final OU-6 ROD with all signatures issued 28 Feb 2018.**
- **Phase 3 lead based paint soil cleanup and site restoration completed on 26 Jan 2018. The soil remediation report is under final preparation for submittal.**
- **Oct 2017 data summary report under AF review**
- **Response to ADEQ comments on field variance memo for groundwater sampling under AF review**
- **Jan 2018 groundwater results provided in Mar BCT conference call**



Site SS017 Groundwater Monitoring Update Path Forward

- **Submit lead based paint soil remediation report**
- **Submit Oct 2017 groundwater monitoring data summary report currently under AF review**
- **1Q 2018 groundwater monitoring data summary report in preparation for AF review**
- **2Q 2018 groundwater sampling scheduled for 23 Apr 2018**
- **A land use control inspection will be performed in 2018.**

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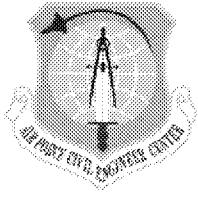
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**RAB Adjournment
Update**

**BCT Meeting
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RAB Adjournment

- **Timeline**
 - **This Spring, send out Newsletter**
 - Provides updates on key projects, announces completion of final ROD
 - Seek input on preferred ways to receive environmental news updates, in lieu of RAB
 - **Early Fall, hold Public Comment Period* on adjournment**
 - Gather public comments on adjournment
 - Confer with Regulatory Agencies and make decision
 - * Does not require a meeting, will be announced in local papers and via email
 - **Call RAB members when decision is reached**
 - **Late Fall, hold last meeting. It will be FINAL meeting of RAB**
(pending outcome of public comment period)
 - AF will announce its rationale for adjournment at the meeting and give an overview of restoration work done to date at Williams
 - AF will share ways public can stay informed about on-going work
 - **Issue adjournment decision**
 - Add to Administrative Record, issue public notice

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BCT GENERAL UPDATE

**BCT Meeting
17 April 2018**

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***2018 BCT
MEETINGS/CONFERENCE
CALLS SCHEDULE
DELIVERABLE TRACKING***

**BCT Meeting
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ACTION ITEMS

**BCT Meeting
17 April 2018**